

ANALYSIS IN SUMMARY—RECOMMENDED ACTION IN SUMMARY

The following is a summary of the almost 500 pages of analysis, and another 400 pages of specialist reports and Appendices. The Southeast Galena DEIS was written designed with 4 action alternatives which specifically addressed aquatics, vegetation and infrastructure projects. This analysis is no longer being considered, as a decision document and now is an analysis tool for future projects in these “key subwatersheds.”

Aquatics Projects

Past land management has changed disturbance regimes, leading to simplified aquatic habitats and declines in water quality in the analysis area (see Sections 1.2.1.1 Undesired Condition: Early Season Peak Flows, page 8, 1.2.1.2 Undesired Condition: High Stream Temperatures, page 10, and 1.2.1.3 Undesired Condition: Damaged Aquatic Habitat, page 11). Geologic and climatic setting and changes in disturbance regimes present both opportunity and risk in attempting to restore aquatic habitats and change hydrologic processes. This analysis presents a range of action (see Chapter 2 beginning on page 38) and expected consequences of restoration activity (see Chapter 4 beginning on page 237). A finer scale analysis in implementation of recommended action will clarify risks for a decision maker and regulatory agencies on a site specific basis. The alternatives presented in this document (Galena WA, Supplement—2002) or another reasonable range of alternatives may be recommended for future efforts. Currently, in the subwatersheds of the analysis area, upland, riparian, and stream channel conditions cause peak stream flows in early spring which allows water to leave the landscape early in the season. These peak stream flows in early spring has the consequence of low water flow and high water temperatures during late summer months. This analysis clearly shows that aquatic restoration projects, if implemented could improve hydrologic/fisheries conditions such as: stream-channel stability, and riparian shade. Additionally, some restoration projects that have been considered could restore the disengagement between stream channel and floodplain, and restore the meandering nature of streams. To improve hydrologic function and fisheries habitat, projects within certain stream channels could be implemented by the use of heavy equipment. By recommending project actions implementation could move hydrologic/fisheries conditions toward a Properly Functioning Condition (ICBEMP 2000).

While some riparian areas are slowly improving naturally, the implementation of aquatic projects similar to those in this assessment could begin an acceleration of improvement in a manner that threatened fish populations would begin to benefit from an improved riparian environment soon after implementation. Such actions may be vital to threatened species as these areas have the viability of being restored to historic conditions or establish trend that move aquatic areas in a direction similar to historic conditions.

Vegetation Projects

Current vegetation conditions are not within the Historic Range of Variability (HRV), with smaller trees than existed in historic unaltered forests and a higher proportion of small fire prone fir trees rather than the more fire resistant Ponderosa pine and western larch (see 1.2.1.4 Undesired Condition: Vegetation Outside Historical Range of Variability, page 14). The consequence of this change is an increase in insect damage to trees, and an increase in disease damage to trees which has resulted in an increase in tree mortality compared to historic levels of mortality. With the consequent increase in tree mortality, added fuels and a tendency toward crown fires, the increase in the size and severity of wildfires when compared to historical conditions has been prevalent (see 1.2.1.5 Undesired Condition: High Wildfire Hazard, page 17). The recommended action could initiate restoration across the landscape by thinning the crowded stands of trees and shifting the species composition back to a more resilient mix. Approximately 20% of the analysis area could be mechanically treated by commercial harvest (commercial thinning, understory removal, salvage, and shelterwood treatments), 6% could be precommercial thinned, and 23% of the analysis area could have prescribed fire introduced outside of the

prescribed mechanical treatment areas (most areas mechanically treated could also be prescription burned). These treatments are designed to move vegetative conditions such as forest stand structure and tree species mix toward an historic range. Prescribed fire and mechanical methods are a means to accomplish this transition. This includes intermediate treatments (thinning of mostly small-diameter trees), within the Malheur National Forest *Land and Resource Management Plan*⁹ (LRMP) designated Roadless Areas (*Land and Resource Management Plan* Appendix C).

The harvesting of commercial wood products could be accomplished by tractor, skyline, and helicopter yarding systems. A number of wood products including commercial timber, post and poles, pulp wood, fire wood, and other wood products such as biomass could be an outcome of these treatments.

Some restorative activities such as riparian shrub planting described above could begin in 2002 and the Vincent Vinegar Creek would begin in 2003, while most actions could be completed within the next five years. However, some of the restorative measures, such as prescribed fire and road work may take longer than five years due to timing opportunities, funding, and safety factors. Because safety and other factors must be applied on a project-by-project basis, it is estimated that fire prescriptions may take up to ten years to complete. In 3 to 5 years, projects such as prescribed fire will be evaluated to ensure management direction and intent is being met at that time.

A *Land and Resource Management Plan* non-significant amendment may be needed to reduce big game cover below standards in summer range in the Little Boulder/Deerhorn subwatershed for summer range and to modify existing Dedicated Old Growth (DOG) and Replacement Old Growth (ROG) boundaries other *Land and Resource Management Plan* non-significant amendments may be needed as well. As the Galena Watershed Analysis recommended projects analyzed in this document (Galena WA, 1999) and adhered to the Federal Guide to Guide for watershed analysis, this supplementary document (Galena WA, Supplement—2002) maintains a format as per CEQ regulations to facilitate future NEPA project work in the subwatershed of the analysis area.

Infrastructure Projects

Some roads or road segments that are currently located in Riparian Habitat Conservation Areas (RHCA) and reducing shade or increasing sediment to streams, could be relocated to reduce these adverse aquatic impacts. The relocated roads or road segments could be constructed outside of the RHCA, and the old locations could be decommissioned. In some areas planned for vegetation management, new roads could need to be constructed to provide for access. Many of the new roads could be closed upon completion of project activities. Existing roads that are still needed to provide access for management or recreation could receive reconstruction or maintenance work to improve user safety and reduce road related impacts to other resources. Roads no longer needed for management or recreation access could be decommissioned and removed from the transportation system.

⁹ Malheur National Forest *Land and Resource Management Plan* 1990 (also referred to as the LRMP or LRMP)

PURPOSE OF RECOMMENDED RESTORATION AND THE NEED FOR ACTION

- ❑ Improve riparian conditions in reaches of streams which do not presently have the ability to meet Riparian Management Objectives. Considered activities with this purpose will fall under the category of **Aquatic Projects** and relate to the needs of hydrology and fisheries.
- ❑ Improve the health, vigor, and resiliency of forest vegetation by actively managing forest stands toward the historic range of variability. Considered activities with this purpose could fall under the category of **Vegetation Projects** and relate to the needs of forest stands, understory vegetation, aspen, and noxious weeds.
- ❑ Reduce impacts from roads, trails, and camping facilities, specifically impacts to water quality, fish habitat, and wildlife habitat. Considered activities with this purpose will fall under the category of **Infrastructure Projects**. While these activities benefit fisheries needs, as do the Aquatic Projects—they are related to road and trail system administrated by the Forest Service and are tracked separately.

Undesired/Desired Conditions

The following table displays the identified undesired conditions and the desired condition with a statement of need. The difference between the undesired and desired conditions are the basis and foundation of the preceding underlying purpose and need to which the agency is responding in recommending the above action. A complete discussion of these conditions can be found on the appropriate page numbers.

Summary Table 2—Undesired/Desired Conditions Matrix.

UNDESIRE D CONDITONS	DESIRED CONDITIONS	STATEMENT OF NEED
1.2.1.1-Across the landscape, peak stream flows in early spring are intensified, reducing water availability for late season flows.(see page 8)	1.2.2.1-By implementing aquatic, vegetation and infrastructure projects, cool water is held for longer periods across the landscape of the analysis area and available in late summer/early fall for fish and wildlife species. (see page 21)	A need exists to capture and hold water into the summer/fall season making water available for fish and wildlife species during this critical time of year.
1.2.1.2-A number of streams do not meet Federal Clean Water Act standards and are on the State 303(d) <u>List of Water Quality Limited Waterbodies (1998)</u> . (see page 10)	1.2.2.2-With aquatic and infrastructure projects, improved habitat conditions and lowered temperatures for streams within the analysis area are in a manner that sustains viable populations of threatened fish species. (see page 22)	A need exists to lower stream temperatures that are on the 303(d) List of Water Quality Limited Waterbodies (1998) toward Federal Clean Water Act standards.
1.2.1.3-Some stream segment habitat conditions are outside an expected range for fish species. (see page 11)	1.2.2.3-By implementing aquatic projects damaged stream segments within the analysis area are repaired and habitat is created that improves and sustains viable fish populations. (see page22)	A need exists to correct damaged stream segments in a manner that demonstrates aquatic habitat conditions that are capable of sustaining viable populations of fish species.
1.2.1.4-Vegetation conditions are outside the historic range of variability for the current climatic period.(see page 14)	1.2.2.4-By implementing vegetation and infrastructure projects, resilient plant life dominates the landscape of the analysis area that now has the ability to withstand endemic disturbance regimes of insect infestation, disease infections, and wildfire. (see page 24)	A need exists to alter deteriorating forest stands across the landscape, moving conditions toward historic forest stand structure, composition, and density in a resilient manner and range that withstands endemic, natural disturbance factors such as disease infection, insect infestation and low intensity wildfire.
1.2.1.5-Uncharacteristically severe wildfires are likely to occur. (see page 17)	1.2.2.5-By implementing vegetation and infrastructure projects, fire adapted forest stands once again dominate the landscape	A need exists to change stand structure, landscape vegetation patterns, and species composition across the landscape in order

UNDESIRE D CONDITONS	DESIRED CONDITIONS	STATEMENT OF NEED
	in a mosaic pattern where wildfires normally burn with low intensity over most of the area. (see page 25)	to construct a reasonable replica of historic conditions and reduce the likelihood of uncharacteristically severe wildfire, destroying multiple resources and human values.
1.2.1.6-Terrestrial Wildlife habitat is currently degraded or missing essential components because of past activities. (See page 18)	1.2.2.6-By implementing vegetation and infrastructure projects, resilient patterns, corridors, linkages, and forest stands once again dominate the landscape and are resilient to endemic disturbances and provide proper structure and cover for wildlife. (see page 27)	A need exists to restore deteriorating wildlife habitats.
1.2.1.7-Noxious weeds are invading the ecosystem and displacing native species. (see page 20)	1.2.2.7-By implementing aquatic, vegetation, and infrastructure projects, the landscape is free of noxious weeds and supports native ground cover. (see page 28)	A need exists to remove populations of noxious weeds in the analysis area and replace these affected areas with a healthy native vegetation ground cover that can resist the further spread of noxious weeds.

SCOPING

The Forest Service requested information and comments from Federal, State, and local agencies; tribes; and other groups or non-governmental agencies as well as individuals interested in or affected by the recommended action. The responses received during this scoping process were grouped into the following issue statements.

Issues Studied in Detail

The following issues statements derived from the scoping process, were used in formulating the range of alternatives.

ISSUE #1—Restricted Access

Issue Statement: *The Agency's recommended action to decommission and close a number of roads will reduce motorized access within the analysis area.*

ISSUE #2—Effects of All Terrain Vehicle (ATV) use

Issue Statement: *The Agency's proposal is inadequate in addressing ATV use that is causing resource damage, especially within RHCAs.*

ISSUE #3—Effects of Ground Based Systems

Issue Statement: *The Agency's recommended action of tree harvest with associated activities could cause unnecessary damage to the hydrologic function of the area's soils and streams.*

ISSUE #4—Effects of Heavy Equipment in RHCAs

Issue Statement: *The Agency's proposal of using heavy equipment within RHCAs to create a meandering nature to stream channels, enhance aspen stands, and to place in-stream structures may damage stream channel functioning.*

ISSUE #5—Effects of Prescribed fire in RHCAs

Issue Statement: *The Agency's proposal to allow prescribed fire to burn within some Riparian Habitat Conservation Areas (RHCAs) will reduce riparian vegetation, and may decrease shade and soil holding capacity.*

ISSUE #6—Inadequate RHCA Size

Issue Statement: *The Agency's design to apply Pac Fish buffers may be inadequate in size to protect fish and their habitat.*

ISSUE #7—Impacts from Activities within RHCAs

Issue Statement: *The Agency's recommended action to remove material from within RHCAs may adversely impact the riparian resource and harvest associated activities with new stream crossings may reduce riparian functioning.*

ISSUE #8—Effects of Toxic Chemicals

Issue Statement: *The Agency's proposal to use chemicals to control competing vegetation, noxious weeds, and pocket gophers may pose harmful risks to aquatic and terrestrial wildlife and to humans during use of the area.*

ISSUE #9—Inadequate Amount of Treatment

Issue Statement: *Current forest stand composition and structure predispose stands toward a risk of uncharacteristically large, severe fire, insect infestations, and disease infections. The Agency's recommended action does not manage enough forest stands to adequately meet the purpose of this action of returning this area to a historic range of variability for stand composition and structure.*

ISSUE #10—Insufficient Pileated Woodpecker Habitat

Issue Statement: *The proposal does not adequately address needed habitat for pileated woodpeckers according to current scientific literature (i.e., 1993 study by Bull and Hothausen).*

ISSUE #11—Effects on Connectivity for Wildlife

Issue Statement: *The Agency's proposal needs to manage wildlife corridors for old growth dependent species (LRMP Amendment #2 connectivity) and the Key Linkage Areas (KLA)s for wide-ranging carnivores more aggressively to reach the forest stand HRV.*

ISSUE #12—Effects of Managing Roadless Areas

Issue Statement: *Roadless areas provide large, relatively undisturbed landscapes, which are important to biological diversity and the survival of species dependent upon the "undisturbed character," of these areas. Management could alter this character as well as the quality of dispersed outdoor recreation for undisturbed open space and natural settings.*

DECISION FRAMEWORK

After project specific NEPA is complete the Responsible Official may decide whether or not to:

Select the Recommended Action,

Select an alternative to the Recommended Action, or

Select portions from the developed range of alternatives and combine them in a logical package as long as the combined effects are fully disclosed and understood.

In selecting one of the above options, the terms and conditions of the selection will be fully displayed and understood. Within the parameters of this decision space, it will also be determined if a *Land and Resource Management Plan* amendment could be necessary.

This analysis documents the results of the anticipated effects of the alternative of no action and range of action alternatives. From these results, the responsible official will have considered appropriate options in making sound environmental decisions and the responsible official will have been as well, properly informed of the disclosure of anticipated environmental effects.

ALTERNATIVE FRAMEWORK

For a better understanding of specific components of alternatives, refer to the alternative comparison table after the alternative descriptions.

Alternative 1—No Action

This alternative provides a baseline for comparison with the action alternatives and is required under 40 CFR 1502.14(d) when completing an Environmental Impact Statement or an Environmental Assessment.

No new management actions would occur, however present management projects could continue at current levels. The identified undesired conditions of early peak water flows, elevated stream temperatures, damaged stream segments, deteriorated forest stands, high risk of uncharacteristically severe wildfire, degraded wildlife habitat, and displaced native ground cover due to noxious weed invasions would all continue at their current condition with adverse trends expected to continue. Disturbance risks of uncharacteristically severe wildfire, higher than normal levels of insect infestation, and debris slides are expected to continue.

Alternative 2—Recommended Action

This alternative would initiate restoration management across the landscape: this includes 20% mechanical treatment by commercial harvest; 6% mechanical treatment by pre-commercial thinning; and prescribed burning on 47% of the Analysis Area (Galena WA, Supplement—2002). The total Analysis Area (Galena WA, Supplement—2002) includes National Forest land and other ownerships encompassing seven subwatersheds totaling 49,473 acres of the greater Galena Watershed (see Map A Vicinity Map page i). Restoration projects are designed to begin reversing adverse hydrologic/fisheries and vegetation trends while accelerating other slowly improving riparian trends. Project activities would improve hydrologic/fisheries conditions such as stream-channel stability, riparian shade, stream meander, and peak stream flows in early spring toward their properly functioning condition. Heavy equipment would be used within stream channels to improve hydrologic function and fisheries habitat.

Vegetation projects are designed to move forest stands and associated vegetation such as stand structure and tree species mix toward their historic range. New roads would be included in this proposal to access areas for management as well as relocate other roads currently located in RHCA's. Most new roads would be closed upon completion of these projects and a number of roads no longer needed for management, recreation access, or are causing resource damage would be decommissioned and removed from the transportation system. Prescribed fire and mechanical methods, including commercial harvest using tractor, skyline, and helicopter systems and precommercial thinning would be used to implement vegetation prescriptions in order to improve and enhance the growth, quality, vigor, and resiliency of forest stands across the landscape. This includes intermediate treatments (thinning), within the Malheur National Forest *Land and Resource Management Plan* designated Roadless Areas (LRMP Appendix C). A number of wood products including commercial timber, post and poles, pulp wood, fire wood, and biomass for power generation would be realized with this treatment. Aspen stands would also be enhanced through a number of restoration projects including felling or girdling of encroaching conifer, hand piling and burning of slash, planting of aspen, and fencing to discourage ungulate pressure. Trees felled within conifer treatment in aspen sites, which occur in RHCA's may be removed as long as down and in stream LWD standards are met.

Aquatics Projects

While some riparian areas are slowly improving naturally, implementation of aquatic projects now, would begin accelerating conditions in a manner that threatened fish populations begin to benefit from an improved riparian environment at the time of implementation. Aquatic project activities would improve hydrologic/fisheries conditions such as: stream-channel stability; riparian shade; and the lack of a meandering nature the streams currently exhibit. These conditions collectively cause peak stream flows in early spring to allow too much water to leave the landscape too soon, with the consequence of low water flow and high water temperatures during late summer months. To improve hydrologic function and fisheries habitat, some projects within certain stream channels would be implemented by the use of heavy equipment. Project actions would improve hydrologic/fisheries conditions toward a properly functioning condition.

Vegetation Projects

This recommended action would initiate restoration management across the landscape: this includes 20% mechanical treatment by commercial harvest; 6% mechanical treatment by pre-commercial thinning; and prescribed burning on 47% of the Analysis Area (Galena WA, Supplement—2002). A

number of projects are designed to move vegetative conditions such as forest stand structure and tree species mix toward an historic range. Prescribed fire and mechanical methods accomplish this transition. Mechanical methods include: commercial harvest implemented by tractor; skyline; and helicopter systems. Additionally, pre-commercial thinning would be used to implement vegetation prescriptions in order to improve and enhance the growth, quality, vigor, and resiliency of forest stands across the landscape. This includes intermediate treatments (generally small-diameter trees), within the Malheur National Forest *Land and Resource Management Plan*¹⁰ designated Roadless Areas (LRMP Appendix C). A number of wood products including commercial timber, post and poles, pulp wood, fire wood, and other wood products such as biomass would be an outcome of these treatments.

Infrastructure Projects

Some roads or road segments that are currently located in Riparian Habitat Conservation Areas (RHCAs) would be relocated. For the location of Riparian Habitat Conservation Areas see Appendix E, Map 3—Management Areas and Roadless Areas and Map 29—Access Travel Management Plan Alternatives 2, 3, and 4. The relocated roads or road segments would be constructed outside of the RHCA area, and then the old locations would be decommissioned. New roads would be constructed to access areas for prescribed vegetation management where necessary. Many of the new roads would be closed upon completion of project activities. Existing roads that are still needed to provide access for management or recreation would receive reconstruction or maintenance work needed to improve user safety and reduce road related impacts to other resources. Roads no longer needed for management or recreation access would be decommissioned and removed from the transportation system.

To see specific project intensity for all projects, refer to Table 68, page 103. See also Appendix E, Map 8—Stream and Riparian Rehabilitation for Action Alternatives; Map 13—Recommended Logging Systems Alternative 2; Map 16—Prescribed Fire Opportunities Alternative 2 and 5; Map 20—Wildlife Connectivity—For Action Alternatives; Map 29—Access Travel Management Plan Alternatives 2, 3, and 4; Map 31—Recommended Trails, Trailheads, and Campsite Projects—For Action Alternatives; Map 28—Noxious Weed Sites—Existing Condition; and Map 9—Recommended Mechanical Treatments Alternative 2.

A non-significant Land and Resource Management Plan amendment would be required to :

- ❑ Reduce big game cover below *Land and Resource Management Plan* standards (in summer range) in the Little Boulder/Deerhorn subwatershed.

Modify existing DOG/ROG boundaries to match logical topographical features such as stream and roads and/or existing stand boundaries, and to meet minimum *Land and Resource Management Plan* standards.

Alternative 3—Reduced Short-Term Impacts

This alternative strives to reduce potential short-term impacts to the analysis area from direct impacts from the long-term restoration treatments. For instance, only hand crews would be used to implement instream projects and heavy equipment would not be used. Approximately 15% of the analysis area would be mechanically treated by commercial harvest (commercial thinning, understory removal, salvage, and shelterwood treatments), 5% would be precommercial thinned, and 22% of the analysis area would be prescribed burned outside mechanical treatment areas (most areas mechanically treated would also be prescribed burned). There would be no use of chemical herbicides or rodenticides for seedling protection. There would not be any commercial harvesting in *Land and Resource Management Plan* inventoried roadless areas. The same access management plan would be implemented as for Alternative 2, with a few minor differences due to the reduced harvesting. Products such as commercial timber, post & poles, pulpwood, biomass, and firewood would still be realized.

¹⁰ Malheur National Forest *Land and Resource Management Plan* 1990 (also referred to as the Forest Plan or LRMP)

A *Land and Resource Management Plan* non-significant amendment would be needed to modify existing DOG and ROG boundaries and to expand pileated woodpecker feeding areas.

Alternative 4—No Harvest Restoration

Alternative 4 strives to enhance and improve the area's vegetative processes with out the use of commercial harvest. The area's vegetation will be treated by use of prescribed fire on 39% and precommercial thinning on 6% of the analysis area (2/3 of the thinning would be prescribed burned, 1/3 would not). Trees would not be removed as a timber sale product. Some relocation of roads out of RHCA's would occur and no heavy equipment would be used within stream channel restoration projects. Prescribed fire and pre-commercial thinning would occur within the *Land and Resource Management Plan* inventoried roadless areas. See the comparison table below for more detail.

A *Land and Resource Management Plan* non-significant amendment would be needed to modify dedicated old growth areas to logical boundaries and to reduce big game cover below standards in Little Boulder/Deerhorn Subwatershed for summer Range. A significant amendment would be needed to change the Davis Creek Trail from motorized to non-motorized use.

Alternative 5—Reduced Helicopter Logging; Increased Access

This Alternative was designed to address ISSUE #1—Restricted Access(see page 30) and ISSUE #9—Inadequate Amount of Treatment (see page 33). Alternative 5 is more aggressive in treating vegetation to increase sustainability and resiliency. Approximately 23% of the analysis area would be mechanically treated by commercial harvest (commercial thinning, understory removal, salvage, and shelterwood treatments), 6% would be precommercial thinned, and 22% of the analysis area would be prescribed burned outside mechanical treatment areas (most areas mechanically treated would also be prescribed burned).

This alternative reduces harvesting costs by incorporating more tractor skidding and less helicopter yarding. This alternative would require additional new roads and would leave more roads open than recommended in Alternatives 2 or 3. Identified roads no longer needed for management, recreation access, or are causing resource damage would be decommissioned and removed from the transportation system. Hydrologic/fisheries projects are similar to Alternative 2 in that heavy equipment would be used within stream channels. The *Land and Resource Management Plan* inventoried roadless areas would also receive more treatment than in Alternative 2. Various wood products would be realized as in Alternative 2.

A *Land and Resource Management Plan* non-significant amendment would be needed to reduce big game cover below standards in Little Boulder/Deerhorn, Vincent, and Vinegar Subwatersheds for summer range; reduce big game cover below standards in Tincup/Little Butte Subwatershed for winter range; increase open road densities beyond standards in Vincent Subwatershed for summer range and Little Boulder/Deerhorn and Butte Subwatersheds for winter range; and to modify existing DOG and ROG boundaries.

Design Summary of Action Alternatives

The following tables summarize features of the aquatic, vegetation, and infrastructure projects per alternative in a side-by-side comparison.

Summary Table 3—Aquatic Project Design

PROJECT	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Hydrology				
Streamside/Riparian Hardwood Protection	4 Miles 12 Acres	4 Miles 12 Acres	4 Miles 12 Acres	4 Miles 12 Acres
Streamside/Riparian Hardwood Planting and Protection	16 Miles 16 Acres	16 Miles 16 Acres	16 Miles 16 Acres	16 Miles 16 Acres
Channel/Streamside Projects	90 Miles	90 Miles	90 Miles	90 Miles
Area Projects	1,450 Acres	1,450 Acres	1,450 Acres	1,450 Acres
Channel/Floodplain Rehabilitation	3 Miles 14 Acres	0 Miles 0 Acres	0 Miles 0 Acres	3 Miles 14 Acres
Fisheries				
New Instream Structures	79 Structures	0 Structures	0 Structures	79 Structures
Improve Existing Instream Structures	36 Structures	36 Structures ▲	36 Structures ▲	36 Structures
Riparian Planting ◇	5.5 Miles	5.5 Miles	5.5 Miles	5.5 Miles
Culvert Removal or Replacement	2 Removal 22 Improve or Replace	2 Removal 22 Improve or Replace	2 Removal 22 Improve or Replace	2 Removal 22 Improve or Replace
NOTES: ALT. = Alternative ▲ = Would not be implemented if heavy equipment is needed ◇ = Work associated with instream structure projects				

Summary Table 4—Vegetation Project Design

PROJECT	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Conifer and Associated Vegetation				
Commercial Thin	5,720 Acres	4,390 Acres	0 Acres	7,060 Acres
Commercial Thin 1	1,230 Acres	900 Acres	0 Acres	220 Acres
Shelterwood/Commercial Thin	1,690 Acres	1,200 Acres	0 Acres	2,600 Acres
Salvage	250 Acres	250 Acres	0 Acres	250 Acres
Understory Removal	880 Acres	550 Acres	0 Acres	1,230 Acres
Total Harvest Prescriptions	9,770 Acres	7,330 Acres	0 Acres	11,350 Acres
Precommercial Thin	2,160 Acres	1,840 Acres	2,100 Acres	3,080 Acres
Precommercial Thin Within Wildlife Corridors	950 Acres	820 Acres	640 Acres	40 Acres
Tractor Skid	5,090 Acres	4,580 Acres	0 Acres	6,320 Acres
Skyline Skid	2,110 Acres	1,720 Acres	0 Acres	2,610 Acres
Helicopter Yard	2,670 Acres	1,090 Acres	0 Acres	2,570 Acres
Total Harvest Systems				
Roadless Mechanically Treated Acres	930 Harvest	0	203 SPC Only	1,370 Harvest
New Roads	17.7 Miles	17.0 Miles	2.2 Miles	22.2 Miles
Removal of Silviculturally Undesirable Trees	2,570 Acres	1,790 Acres	0 Acres	3,810 Acres
Hand Line needed for Prescribed Burn	37.6 Miles	28 Miles	0 Miles	57.1 Miles
Machine Line needed for Prescribed Burn	11.6 Miles	8.5 Miles	0 Miles	20.6 Miles
Prescribed Burn Associated with Timber Sale	2,550 Acres	1,800 Acres	0 Acres	3,830 Acres
Hand Pile and Burn Associated with Timber Sale	1,250 Acres	940 Acres	0 Acres	1,320 Acres

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PROJECT	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Sub-Soil	190 Acres	190 Acres	0 Acres	270 Acres
Competing Vegetation Control	900 Acres	740 Acres !!	0 Acres	1,320 Acres
Conifer Plant	1,930 Acres	1,440 Acres	0 Acres	2,840 Acres
Pocket Gopher Control	1,690 Acres	1,200 Acres !!	0 Acres	2,600 Acres
Ungulate Browse Control	1,690 Acres	1,200 Acres	0 Acres	2,600 Acres
Yard Tops	5,370 Acres	4,730 Acres	0 Acres	5,640 Acres
Reserve Tree Protection ♠	20,230 Trees	15,520 Trees	0 Trees	29,540 Trees
Prescribed Fire ♣	23,750 Acres	19,190 Acres	19,160 Acres	24,770 Acres
Roadless Prescribed Fire	1,500 Acres	720 Acres	720 Acres	1,500 Acres
Total Upland Acres Treated @	22,010 Acres	18,850 Acres	19,950 Acres	23,000 Acres
Dedicated Old Growth				
Add Dedicated Old Growth Areas	115 acres	115 acres	115 acres	115 acres
Add Replacement Old Growth Areas	1,592 Acres	1,592 Acres	1,592 Acres	1,592 Acres
Add Pileated Woodpecker Feeding Areas	747 Acres	1,505 Acres	747 Acres	747 Acres
Aspen Stand				
Conifer Treatment	25 Sites	25 Sites	25 Sites	25 Sites
Hand Pile and Burn	25 Sites	25 Sites	25 Sites	25 Sites
Buck & Pole Fence	13 Sites @ 19 Acres	13 Sites @ 19 Acres	13 Sites @ 19 Acres	13 Sites @ 19 Acres
Plastic Fence	12 Sites @ 11 Acres	12 Sites @ 11 Acres	12 Sites @ 11 Acres	12 Sites @ 11 Acres
Noxious Weeds				
Manual Treatment	4 Sites @ 0.4 Acres	10 Sites @ 1.9 Acres	10 Sites @ 1.9 Acres	4 Sites @ 0.4 Acres
Chemical Treatment	6 Sites @ 1.5 Acres	0 Sites	0 Sites	6 Sites @ 1.5 Acres
Treat Quarry Sites	Treat 15 Sites Chemically @ 42 Acres	Treat 15 Sites Manually @ 42 Acres	Treat 15 Sites Manually @ 42 Acres	Treat 15 Sites Chemically @ 42 Acres
NOTES: ALT. = Alternative ♠ = Is an average and doesn't include all reserved wildlife trees ♣ = Does not include harvest acres already incorporating a burn prescription				

Summary Table 5—Infrastructure Project Design

PROJECT	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Roads				
Total Road Miles	219 Miles	218 Miles	202 Miles	228 Miles
Total Road Density	2.8 mi/sq. mi.	2.8 mi/sq. mi.	2.6 mi/sq. mi.	2.9 mi/sq. mi.
Reconstructed Roads	165 Miles	165 Miles	165 Miles	171 Miles
Decommissioned Roads	67 Miles	67 Miles	67 Miles	62 Miles
RHCA Decommissioned Roads	23.9 Miles	23.9 Miles	23.9 Miles	23.5 Miles
RHCA Reconstructed Roads	23.2 Miles	23.2 Miles	23.2 Miles	24.7 Miles
Trails and Trailheads				
Decommissioned Trails	1.7 Miles	1.7 Miles	1.7 Miles	1.7 Miles
Reconstructed Trails	8.3 Miles	8.3 Miles	0 Miles	8.3 Miles
Constructed Trails	2.3 Miles	2.3 Miles	2.3 Miles	7.9 Miles
New Trail Heads	2	2	2	2
Removed Trail Heads	4	4	4	4
Dispersed Camp Sites				
New Dispersed Camp Areas	3	3	3	3
Improved Dispersed Camp Areas	2	2	0	2
Removed Dispersed Camp Areas	3	3	3	3
NOTES: ALT. = Alternative				

Projects Considered but Eliminated from Detailed Analysis

- ❑ Roads in *LRMP* Appendix C—Roadless Areas
- ❑ Harvest and prescribed fire in the scenic and wildlife emphasis areas
- ❑ Harvest within RHCAs except for blow down area of Vincent and Vinegar Creek, road construction, and aspen groves
- ❑ Reconstruction of Forest Road 4559
- ❑ Replacement trailhead for Lemon Cabin Trailhead
- ❑ Prescribed fire within higher elevation Moist and Cold Forest types

ENVIRONMENTAL CONSEQUENCES PER GROUPED UNDESIREDD/DESIRED

The first section displays a comparison of the alternatives by impacts per identified undesired condition. Some of the undesired conditions were grouped due to overlapping impacts and similarities. This second section is similar but displays the anticipated impacts per Issue.

Undesired Condition—Early Season Peak Flows

Undesired Condition—High Stream Temperatures

Undesired Condition—Damaged Aquatic Habitat

The comparison of these three undesired conditions were combined due to their overlapping influences and similarities.

ALTERNATIVE COMPARISON

AQUATIC PROJECTS

Alternative 1 would do nothing to help improve or enhance riparian conditions, thereby no habitat for the fish utilizing these water bodies would be improved. Early season peak flows, in the late season when stream flows are critical, would continue. Stream channels would remain in their current condition, thereby the rapid run-off of water during the spring would continue. Riparian shade would continue to be below potential along many streams, thereby diminishing the ability to maintain cooler water temperatures.

Expected natural recovery trends in Alternative 1 are quite slow and noticeable change is not expected for at least 50 years as riparian vegetation begins to naturally recover and debris recruitment begins to form pools.

Summary Table 2, on page xxiii, displays aquatic projects that would restore and enhance riparian habitat, which in time, would improve hydrologic function and fish habitat. These streamside and instream structure projects are expected to slow overland flow and capture sediment, improving infiltration and reducing run-off. Water storage capacity associated with the improvements and enhancement of currently disconnected floodplains in meadows and seeps/springs is expected to increase. Sediment would be trapped creating additional in-channel storage. Channels would be reconnected to floodplains by developing channel meander and reconnecting side channels. As riparian habitat improves, i.e. vegetation, stream bank stability would improve reducing sediment delivery and channel shape. Stream temperatures are expected to be the maintained once riparian vegetation providing shade is restored. Water is also expected to absorb into the soils replenishing water to the underground aquifers. Alternatives 2 and 5 would use heavy equipment within stream channels to

expedite and maximize effectiveness of improvement projects while Alternatives 3 and 4 would not use heavy equipment.

These benefits from these projects are mainly long-term, but within the first year the healing process will have begun.

VEGETATION PROJECTS

Summary Table 6 page xxvi, displays the potential estimated impacts to the soil types that have differing degrees of sensitivity to harvest activities. The major disturbances of concern are compaction and displacement that influences how storm events and spring runoff respond to soil conditions. The harvest systems of tractor, skyline, and helicopter are combined in the totals with tractor having the biggest influence on the total estimated disturbance. Alternative 1 is the No-Action Alternative and Alternative 4 has no commercial harvest, therefore, no additional disturbance from harvest activities would occur under these Alternatives.

Summary Table 6—Harvest Area and Estimated Area of Detrimental Disturbance (Acres)

SOIL TYPE	ALT. 2		ALT. 3		ALT. 1 & 4		ALT. 5	
	Total Acres	Est. Dist.	Total Acres	Est. Dist.	Total Acres	Est. Dist.	Total Acres	Est. Dist.
Inclusions, clayey-nonforested	1301	219	1183	205	0	0	1357	228
Clayey, forested	553	109	550	109	0	0	553	109
Ash over clayey	1431	162	628	99	0	0	1657	164
Residual serpentine	60	7	60	7	0	0	41	7
Ash over serpentine	459	55	426	49	0	0	459	55
Ash over granitics	368	44	314	39	0	0	371	44
Miscellaneous	697	83	582	73	0	0	844	96
Other	4722	707	3672	565	0	0	5278	805
TOTAL	9591	1386	7415	1146	0	0	10560	1508
NOTES: ALT. = Alternative EST. DIST. = Estimated Disturbance based on calculation in 2000.								

Impacts from post harvest activities, along with applied mitigation, are expected to be negligible on hydrologic function and fish habitat.

Summary Table 8 displays the percent of potential disturbance, depending on type of soil and its sensitivity to erosion, to the amount of activity on these soils, including tractor skidding, skyline skidding, and helicopter yarding.

Summary Table 7—Percent Estimated Disturbance to Total Harvest Activity

ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
0	14	15	0	14

Prescribed fire is expected to reduce wildfire hazard resulting in decreases of potential uncharacteristic severe wildfire decreasing the extent of soil damage. By reducing risk of the impacts of severe wildfire these soils would allow water absorption and storage capacity to be maintained across the landscape reducing concentrated overland flows, therefore retaining water for longer periods of time. Both recommended harvest and prescribed fire contribute to the reducing fire hazard.

Summary Table 8—Percent Crown Fire Hazard Remaining Per Forest Type Per Alternative

Crown Fire Hazard by Forest Type	ALT. 1 Existing	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Dry Forest					
High	66	44	50	61	40
Low/Moderate	34	56	50	39	60
Moist Forest					
High	60	55	56	59	54
Low/Moderate	40	45	44	41	46

NOTE: ALT. = Alternative

INFRASTRUCTURE PROJECTS

Roads and trails influence water quantity and timing of when run-off is delivered to streams by intercepting surface and subsurface flows, altering flow paths, and accelerating the removal of water from the landscape.

The net result of implementing road decommissioning and constructing projects is displayed on S-Table 8. These decreases would promote the capture, storage, and safe release of precipitation and are expected to reduce risk of road failures at stream and road crossings due to these road removals. Long-term benefits are expected as soon as 10 years and in other areas in 50 years once the initial disturbance is healed and bank vegetation is established.

Vegetation establishment and capture of sediments in newly developed channel meander is expected to occur within the first year of implementation. About 20% of the planted streams are expected to meet *Land and Resource Management Plan* standards for shade before year 50 with other stream segments moving closure toward the standard. The alternative using heavy equipment to improve aquatic habitat is expected to have a larger impact on enhancement of the riparian habitat. Davis, Vincent, Caribou, Butte, Granite Boulder Creeks and along the Middle Fork of the John Day River are where heavy equipment would be used to improve aquatic habitat. The difference in recovery is expected to be delayed for about an additional 40 years in Alternative 3 and 4 as compared to the expected noticeable recovery in about 10 years as projected in Alternative 2 and 5.

Fewer road miles equate to decreased risk or impacts to other resources; however, there would be less access as well effecting recreational and management uses.

Summary Table 9—Transportation System (Miles)

ITEM	ALT. 1 Existing	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Total Miles	267	219	218	202	228
% Change	NA	-18%	-18%	-24%	-15%
Total Miles Decommissioned	0	67	62	62	62
Decommissioned Miles within RHCAs	0	44	44	44	43
Decommissioned Miles on Sensitive Soils	0	55	55	55	52
New Road Miles	0	18	17	2	22
Total Road Density *	3.45	2.83	2.82	2.61	2.95

NOTE: NA = Not Applicable * Miles per Square Mile

The recommended recreation decommissioning of the stream-ATV crossings, improvement of trail/stream crossings, relocation of dispersed campsites, and decommission of three dispersed campsites in RHCAs are expected to have similar benefits as above but smaller in scale, however cumulatively with other projects the long-term results will be beneficial.

EQUIVALENT ROADED AREA (ERA)

A computer model was used to rate the overall cumulative impacts on hydrologic function, which directly ties to these undesired conditions. This model gives the reader a relative sense of overall hydrologic condition at the subwatershed scale. These results are not intended to be a conclusive result or degree of significance but an indication for concern. The anticipated impact of an alternative is compared to the equivalent impacts expected from a road.

A Threshold of Concern (TOC) is established per subwatershed depending on soil types, vegetation, slopes, etc. The TOC represents a point of concern for the hydrologic function, which also reflects potential impacts on fish and their habitat. The following are the results from this analysis for each subwatershed, per alternative, and expected impact at implementation and about ten years out.

Summary Table 10—ERA Model Results

PROJECT	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Davis/Placer TOC 16					
Year 2002	4.7	8.8	8.1	4.7	9.1
Year 2012	3.9	6.7	6.2	3.8	7.0
Vinegar TOC 14					
Year 2002	6.8	10.5	10.4	6.8	12.2
Year 2012	5.1	7.5	7.5	5.0	8.9
Vincent TOC 14					
Year 2002	7.6	14.4	13.9	7.6	16.5
Year 2012	5.7	10.4	10.0	5.7	12.1
L. Boulder/Deerhorn TOC 14					
Year 2002	6.9	9.6	8.7	6.9	10.2
Year 2012	5.3	7.2	6.5	5.2	7.6
Tin Cup/L. Butte TOC 12					
Year 2002	4.3	8.2	6.6	4.3	8.8
Year 2012	3.7	6.2	5.1	3.4	6.8
Butte TOC 12					
Year 2002	5.1	6.9	6.5	5.1	7.2
Year 2012	4.2	5.2	4.9	4.0	5.5
Granite Boulder TOC 18					
Year 2002	7.6	7.7	7.7	7.6	7.7
Year 2012	5.7	5.5	5.5	5.5	5.5

Undesired Condition—Vegetation outside HVR

Undesired Condition—High Wildfire Risk

These two undesired conditions were combined due to their similar impacts on vegetation. The discussions will focus on the Dry Forests (predominately ponderosa pine and larch) and the Moist Forests (predominately Douglas-fir and grand fir). The main areas expounded upon below are effects on the desired condition, structural stages, resiliency and sustainability, wildfire risk, public safety and property, and air quality.

ALTERNATIVE COMPARISON

DESIRED CONDITION

Alternative 1 would not treat any forest stands to begin moving their structure, composition, and density toward a desired condition. Stands would continue to become more overstocked, growth would continue to slow, fuels would continue to accumulate, and the forest stands would become increasingly susceptible to uncharacteristically severe disturbances.

The following table displays the percentage of the area receiving treatment of the total area identified as needing silvicultural treatments. The degree of moving toward the desired condition is proportionate to the amount of forest stands treated.

The forest stands treated would respond over several years, adding more crown area and increasing tree growth. Species composition would be shifted toward a more historic condition, giving preference to the early seral species i.e. ponderosa pine. The trees in these areas would improve and increase in health and vigor, which would cause the development of the old forest structural stages to accelerate, decreasing the time for trees to develop into the old structural stages by 40 to 60 years over Alternative 1. Treated forest stands would become more resilient to disturbance, allowing them to continue to grow into larger trees. Disturbance regimes would be closer to the historic scale.

Summary Table 11—Percent Area Needing Treatment Receiving Treatment

ALT. 1 - No-Action	ALT. 2	ALT. 3	ALT. 4	ALT. 5
0	50%	38%	13%	57%

STRUCTURAL STAGES

The forest stand structural stage of most interest is that of old forest, which is generally lacking across the analysis area. Alternative 1 would do nothing to encourage or expedite growth of old forest structure. The current growing trend would not see development of this structure for about 110 years in the Dry Forests and over 60 years in the Moist Forests.

The forest stands recommended for thinning would develop into old forest structure in about 50 years, with the thinning prescription adapted for wildlife corridors taking an additional 25 years due to additional tree being retained for hiding cover. The understory removal treatments would convert old forest multi-strata¹¹ (OFMS) to old forest single-stratum (OFSS) immediately. Shelterwood regeneration treatments to change species composition would develop into OFSS structure in about 125 years.

Summary Table 12—Expected Percent of Structural Stages in 125 Years

FOREST TYPE	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
Dry HRV	5-15	5-25	5-10	5-10	5-15	30-55	5-15
Alt. 1 Existing	5	42	3	7	30	1	12
Alt. 2	5	20	2	7	24	34	9
Alt. 3	5	25	3	7	26	23	11
Alt. 4	5	42	3	7	28	3	12
Alt. 5	5	20	2	7	20	38	8
Moist HRV	10-30	5-10	10-20	10-20	10-20	5-15	15-40
Alt. 1 Existing	6	6	4	6	39	5	34
Alt. 2	6	3	4	6	35	11	34
Alt. 3	6	5	4	6	36	8	34
Alt. 4	6	6	4	6	38	6	34
Alt. 5	6	4	4	6	34	12	34
NOTE: SI = Stand Initiation SEOC = Stem Exclusion Open Canopy SECC = Stem Exclusion Closed Canopy UR = Understory Reinitiation YFMS = Young Forest Multi Strata OFSS = Old Forest Single Strata OFMS = Old Forest Multi Strata HRV = Historical Range of Variation							

In Alternative 1, aspen stands would continue to be displaced due to encroaching conifers and impacted by grazing from cattle and wildlife, further reducing aspen numbers.

¹¹ See stand structure definitions page 145

In Alternatives 2 and 5, aspen stands would be released by removing conifer competition and protecting them from grazing, improving the vigor of existing aspen and increasing the number of suckers, eventually increasing size of aspen patches.

Alternative 3 and 4 would drop and leave conifers or girdle encroaching conifers depending on snag needs in the area. Follow-up protection from grazing would occur. These alternatives would delay aspen recovery 3-5 years due to this material remaining on the site reducing potential suckering. An increase in fire hazard would occur due to the fuel remaining on the site and follow-up fence maintenance may be needed due to girdled trees falling on protection fences.

In Alternative 1, mountain mahogany and other shrubs would continue to decline due to lack of regeneration, low-intensity fires, and sunlight. Likewise, pine grass and other ground cover would continue to decline due to increasing conifer canopy excluding stimulating sunlight from reaching the forest floor and the nutrient cycling provided by low-intensity fire.

In the Action Alternatives, mountain mahogany and pine grass along with other native shrubs, and grasses would increase where conifer crown closures are released or thinned allowing sunlight to reach the forest floor stimulating growth. As forest litter and accumulated fuels are reduced, shrubs and grasses would benefit from frequent, low intensity fire increasing nutrient cycling making them more vigorous. Alternative 5 would proportionately release more forest ground vegetation due to the additional shelterwood and understory removal prescription opening up more stands than that of the other action alternatives.

RESILIENCY AND SUSTAINABILITY

In Alternative 1, forest stands would continue to slow in growth and decrease in vigor as stand density continues to increase. Risk of attack by bark beetles would increase as the trees lose their vigor and are less able to pitch out the beetles. Risk of outbreaks of defoliating insects would continue to increase as the stand composition continues to shift to more late seral species. Dwarf mistletoe infections would spread with stem and root disease expected to increase as well.

In Alternatives 2, 3, and 5, reducing risk of insect, disease, wildfire is proportionate to the amount of forest stands treated. For those stands that are thinned, stands would increase in vigor allowing them to withstand infestations, infections, or high intensity fire. The reduction in the proportion of late-seral species would also reduce the extent of defoliation by spruce budworm and Douglas-fir tussock moth. The increased height growth rates would allow many of the retained trees to outgrow dwarf mistletoe infections, gradually decreasing the amount of crown infected. Increased tree spacing would also contribute to the reduction of lateral spread of mistletoe. Reduction of late-seral trees would reduce the amount of trees susceptible to root diseases and eventually would decrease this disease to endemic levels. Severe wildfire would be reduced due to less amount of trees, less amount of trees that are more susceptible to fire (i.e. Douglas-fir), and less ladder fuels that allow ground fire to climb into the overstory crowns. Overstory crowns would also be reduced decreasing fire intensities and the potential for a crown fire.

In Alternative 4, no harvest would occur but the recommended pre-commercial thin would reduce a portion of the susceptible trees to fire and reduce the ladder fuel component from the understory. The remaining fir trees would be slightly healthier and less susceptible to attacks. Stem and root diseases may actually increase, as the cut stumps can serve as infection pathways to the remaining fire trees. Dwarf mistletoe would not be reduced due to infected overstory trees remaining in the stand that would continue to infect the understory trees.

For a better understanding of alternative responses to improved resiliency and sustainability, S-Table 10 on page xxix displays the percent of recommended treatment on forest stands identified as needing treatment. That table gives a good indication of how well the alternatives respond to this issue..

WILDFIRE RISK

In Alternative 1, ground fuels would continue to accumulate, crown fire risk would increase due to denser forest stands, and fire resistant trees such as ponderosa pine would continue to be replaced by fire intolerant trees such as grand fir. This alternative would not reduce the ground or ladder fuels, which allows ground fires to climb into the overstory canopy. This alternative would not reduce the more fire susceptible tree species in areas that were historically adapted to frequent low intensity fires.

Much of the analysis area would remain at the current high hazard for uncharacteristically severe wildfire. As trees continue to grow and biomass increases, the crown fire hazard would continue to increase. In about 50 years, almost all forest stands would be at a high crown fire hazard.

For the action alternatives, S-Table 7 on page 11 displays a comparison calculated from recommended forest stand treatments. That table displays the percentage of crown hazard reduced per alternative if mechanical treatments are implemented.

In Alternatives 3 and 4, amount of prescribed fire is reduced in the Little Butte and a portion of the Deerhorn drainages due to lack of stands being mechanically harvested, which would have reduced fire intensity.

Refer back to S-Table 7 for the anticipated percent crown fire hazard remaining per forest type once commercial, pre-commercial, and prescribed fire prescriptions per alternative have been fully implemented.

For forest stands thinned to about 60 ft²/acre basal area, a high crown fire hazard rating would not return to these stands for about 50 years. The thinned stands to retain wildlife hiding cover spacing trees to about 80 ft²/acre basal area won't see a return of high fire hazard ratings for about 25 years. The shelterwood treatment won't see a high rating again for 50 years assuming a follow-up pre-commercial thin is implemented.

PUBLIC SAFETY AND PROPERTY

The current fire hazard conditions would continue to increase in Alternative 1 and access for fire-fighting efforts would continue to degrade putting property and personnel at risk. Potential loss to privately owned lands and structures in Bates, Austin, and Austin Junction would remain at risk. In addition, the blow down event that occurred in the upper Vinegar drainage would not be treated and could easily become a large conflagration, threatening private property and structures in the vicinity of the town of Greenhorn.

In Alternatives 2, 3, and 5, a combination of the recommended vegetation treatments lowering the high crown fire hazard in the area and the improved transportation system making access safer and readily available, greatly reduces the risk of uncharacteristically severe wildfire reaching adjacent privately owned lands and structures in Bates, Austin, and Austin Junction. Treatment within the blown down area of upper Vinegar drainages also greatly reduces the chance of a severe wildfire effecting private property and structures in and near the town of Greenhorn. In Alternative 4, the high fire hazard adjacent to privately owned lands and structures in the Bates, Austin, and Austin Junction areas is slightly improved from the No Action alternative. The risk of fire hazard to the private property and structures in the vicinity of Greenhorn is not reduced and the risk remains comparable to the No Action alternative. This result is primarily due to no harvest removing and reducing biomass and accumulated fuels.

AIR QUALITY

In Alternative 1, there would be no impact to air quality due to no recommended management. However, existing biomass would remain available for consumption by wildfires and would continue to accumulate. This situation would increase the potential for large amounts of smoke during the summer months when diurnal inversions could concentrate smoke at low elevation. This raises the risk of personal health problems, or may violate summertime Class 1 quality visibility standards.

In the action alternatives, much of the slash produced from harvest projects in this alternative would be brought to landings and made available for chipping for fiber or as fuel for cogeneration plants. Other units slash would be either broadcast burned or piled and burned under weather conditions that would meet air quality standards. Prescribed burning would be done in areas not harvested to reduce existing fuels and applied only when weather conditions would allow air quality standards to be met.

These actions would reduce the amount of fuels available for wildfire, reducing the possibility of fire occurring during less than desirable times. This would reduce the amount and duration of pollutants produced by a wildfire as well as reducing the fire intensity. Potential for smoke to be produced during summer months and during inversion periods would be greatly reduced, improving visibility and reducing potential health problems. The summertime Class 1 visibility standards would likely be met. Alternative 4 would be much less effective than the other action alternatives due primarily to no recommended harvest.

Undesired Condition—Degraded Wildlife Habitat

Effects to wildlife are summarized in regards to Dry Forest habitats, Dedicated and Replacement Old Growth and their connective corridors, and big game habitat.

ALTERNATIVE COMPARISON

DRY FOREST TYPE

The majority of treatments are recommended in the Dry Forest types; consequently, the following wildlife discussion will summarize effects on the Dry Forest types only. Alternative 2 recommended harvest treatment on 35% of the Dry Forest types. Alternatives 3, 4 and 5, recommended harvest treatment on 8%, 25% and 40% of the Dry Forest types. None of the action alternatives have significant effects on the Moist Forest types; even the most aggressive alternative only treats 10% of this Forest type. For discussion on other Forest types, refer to the analysis document.

Alternative 1 would result in little change in the existing condition of Dry Forest habitats in the short-term (0-10- years). Stand densities would continue to increase with stand structure remaining relatively similar to the current stand structure. In the short- to mid-term (0-25 years), deadwood habitats would increase with some Old Forest Multi Strata (OFMS) stands changing to Young Forest Multi Strata (YFMS) due to loss of large diameter trees. These losses would continue across the 58% forest stands that are identified as high risk due to overstocked conditions making them vulnerable to insect infestations, disease infections, and uncharacteristically severe wildfire.

These overstocked stands would continue to be at risk to a large-scale loss, potentially displacing species that currently reside in these areas. These current conditions do not match that of what the historic fire regime once provided.

In the action alternatives, forest structure and species composition would change immediately following harvest and prescribed burning activities. This table displays the HRV, existing condition as Alternative 1, and the expected results on the structural percentages per alternative.

Summary Table 13—Dry Forest Structural Stage by Alternative (29,000 acres)

ALTERNATIVES	PERCENT OF STRUCTURAL TYPE						
	SI	SEOC	SECC	UR	YFMS	OFSS	OFMS
HRV	5-15	5-25	5-10	5-10	5-15	30-55	5-15
1 (Existing)	5	42	3	7	30	1	12
2	5	43	2	13	24	4	9
3	5	42	3	11	26	2	11
4	5	42	3	9	28	1	12
5	5	43	2	17	20	5	8
NOTE: SI = Stand Initiation SEOC = Stem Exclusion Open Canopy SECC = Stem Exclusion Closed Canopy UR = Understory Reinitiation YFMS = Young Forest Multi Strata OFSS = Old Forest Single Strata OFMS = Old Forest Multi Strata.							

Harvest would convert most of the YFMS stands to a structure of SEOC and UR. In the short-term, habitat would be loss for species that prefer high canopy cover and complex forest stand structure. Alternatives 2 and 5 would potentially reduce the analysis area carrying capacity by one to three reproducing pairs each of pileated woodpeckers and pine martens. Alternatives 3 and 4 would not treat vegetation as aggressively. Alternative 3 would potentially reduce the project carrying capacity by one to two reproducing pairs for each of these species. Alternative 4 would possibly reduce the carrying capacity by one pair. Habitat in the Dry Forests is not considered the highest quality habitat for these species. Population viability for pileated woodpeckers and pine marten would be maintained via old growth in the Moist and Cold Forest types and the system of Dedicated Old Growth, Replacement Old Growth and Pileated Woodpecker Feeding Areas

Restoration treatments, while reducing habitat for pileated woodpecker and pine marten, would improve habitat for white-headed woodpeckers and flammulated owls. Several OFMS stands would be converted to OFSS, creating the open park-like stands these species prefer. Historically 30 to 55% of the Dry Forests supported OFSS habitat; today only 1% is in OFSS. Treatment of younger stands would improve growth rates on trees and reduce the time it takes to grow large diameter trees for future old growth. Alternative 5 would treat the most acres followed by Alternatives 2, 3, then 4. In Alternatives 2, 3 and 5, treated stands would likely take 25-50 years to develop into OFSS, whereas Alternative 1 and 4 would takes about 100-125 years.

DEDICATED/REPLACEMENT OLD GROWTH AND THEIR CONNECTIVE CORRIDORS

There are currently 13 Dedicated Old Growth (DOG) areas, 1 Replacement Old Growth (ROG) area and 1 Pileated Woodpecker Feeding Area (PWFA) designated for pileated woodpecker and/or pine marten management within the analysis area.

In Alternative 1, existing DOG, ROG and PWFA boundaries would not be adjusted nor would new areas be designated.

The Action Alternatives would modify existing DOG and ROG boundaries to match logical topographical features and to meet minimum *Land and Resource Management Plan* standards. These changes would require a *Land and Resource Management Plan* Amendment to be implemented. The Action Alternatives would designate 11 new ROG and 4 new PWFAs.

The following table displays changes or additions made to the existing old growth system:

Summary Table 14— Recommended DOGs, ROGs, and PWFAs

ALL AREAS	INDICATOR SPECIES	MINIMUM ACRES	Existing DOG ACRES	Recommended DOG ACRES	Existing ROG ACRES	Recommended ROG ACRES	Recommended PWFA ACRES	TOTAL Recommended ACRES
TOTALS	Pileated Woodpecker and Pine Marten	4,920	3,099	3,214	181	1,773	747	5,734

In Alternative 3 only, current scientific literature indicates habitat needs for pileated woodpeckers may not be adequately met by current *Land and Resource Management Plan* standards. Alternative 3 increases the size of five pileated woodpecker areas from 600 acres (*Land and Resource Management Plan* direction) to 900 acres. See Issue # 10 for differences between Alternative 3 and the other action alternatives.

In the DOGs, no treatment would be recommended under any of the action alternatives. Management activities are recommended in the ROGs, PWFAs, old growth stands located outside designated areas, and LRMP2 wildlife corridors as displayed in the following table. In this range of alternatives, strategies have been included in the management of the ROGs and Feeding Areas to help restore historic stand structure and fire regimes.

Where these areas don't meet historic conditions, treatments would be implemented to benefit old growth dependent species in the long-term. Management would help restore historic stand structure and fire regimes. Treatments would reduce the risk of an uncharacteristically severe wildfire or insect outbreak, increase the growth of residual trees to provide old structure sooner, and convert OFMS stands (currently over HRV) to OFSS stands (currently below HRV).

Summary Table 15— Recommended Treated Acres within ROGs, PWFAs, Old Growth, and LRMP2 Wildlife Corridors

ALTERNATIVE	HARVEST IN ROGs	HARVEST IN PWFAS	HARVEST IN 300 ACRE ADDITIONS*	HARVEST IN OLD GROWTH OUTSIDE DOGs/ROGs	HARVEST IN LRMP2 WILDLIFE CORRIDORS
1	0	0	0	0	0
2	131	195	257	313	220
3	0	0	0	223	0
4	0	0	0	20	38
5	192	195	257	326	220

NOTE: = Only Alt. 3 expands pileated woodpecker areas by 300 acres. * Harvest in Alts. 2 and 5 treat these areas as General Forest.

BIG GAME HABITAT

Alternative 1 would not address the needs of specific big game habitat to improve forage habitat, reduce potential disturbance from road traffic, and reduce the risk of catastrophic disturbances impacting large areas of habitat.

Alternatives 2, 3, and 4 would meet the needs to improve big game habitat, although to varying degrees. Proportionate to recommended treatment, these alternatives would improve forage habitat, provide well-distributed cover, reduce potential disturbance from road traffic, and reduce the risk of an uncharacteristically severe disturbance that could destroy large areas of habitat. In localized areas, management has the potential to both positively and negatively impact habitat. Timber harvest and pre-commercial thinning, prescribed fire, road closures, and hardwood planting and protection would have the most pronounced effects. In Alternative 4, precommercial thinning would not impact cover habitat to the same degree as the other action alternatives; however, hiding cover would be reduced where pre-commercial thinning is applied.

In Alternative 5, priority is given to restoring historic vegetation conditions, in some subwatersheds, jeopardizing thermal cover standards. Priority is also given to increasing road access, therefore, not meeting standards for open road density in many subwatersheds. Many of the management tools in Alternative 5 are the same as in the other alternatives, however; in many subwatersheds they are used more intensively.

The following table displays acres of satisfactory and marginal cover harvested in summer and winter range. Expected results are displayed for all action alternatives.

Summary Table 16—Percent of Satisfactory and Marginal Cover Harvested in Summer and Winter Range

ALTERNATIVE	SUMMER RANGE		WINTER RANGE	
	Satisfactory	Marginal	Satisfactory	Marginal
LRMP	12	8	10	15
1 (Existing)	2	8	0	3
2	12	28	10	11
3	5	18	10	9
4	2	8	0	3
5	19	34	12	16

Prescribed fire could temporarily displace deer and elk but animals would be expected to return once burning crews have left and ground has cooled. Mortality of overstory trees is not expected to exceed 10%; impacts to thermal cover would be minimal. Prescribed fire would reduce hiding cover when allowed to burn at higher intensity. These burns are expected to stimulate growth of shrubs and grasses, improving browse for deer and elk.

Calving/fawning habitat would improve. A combination of aspen improvement projects, other hardwood plant and protect projects, and decommission and closure of a number of roads within RHCAs would cumulatively enhance habitat. Refer to the aquatic and infrastructure project discussions for additional detail on riparian restoration.

In implementing the above harvest prescriptions, a variety of road projects are needed to accomplish restoration efforts. The road projects used a combination of new, closed, and decommissioned miles, which have implications on big game habitat. The following table displays percent change in total miles for each alternative. A smaller transportation system reduces the potential for big game disturbance.

Summary Table 17—Total Open Transportation System (Miles)

ITEM	ALT. 1 Existing	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Miles	132	91	91	89	164
% Change	NA	-31%	-31%	-33%	+24%
NOTE: NA = Not Applicable					

The following table displays the expected open road densities in summer range, winter range, and the wildlife emphasis area per subwatershed - a measure of potential big game disturbance.

Summary Table 18—Open Road Densities (Miles per Square Mile per Subwatershed)

PROJECT	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Summer Range LRMP Standard 3.2 Minimum 1.5 Objective					
Davis/Placer	1.97	1.44	1.44	1.44	2.55
Vinegar	1.90	1.54	1.54	1.54	2.20
Vincent	1.73	1.72	1.72	1.72	3.59
Little Boulder/Deerhorn	1.27	0.87	0.87	0.87	1.46
Tin Cup/Little Butte	1.41	1.14	1.14	1.14	1.85
Butte	2.72	1.93	1.93	1.93	2.44
Granite Boulder	1.21	0.59	0.59	0.59	0.70
Winter Range LRMP Standard/2.2 Minimum/1.0 Objective					
Davis/Placer	NA	NA	NA	NA	NA
Vinegar	NA	NA	NA	NA	NA
Vincent	NA	NA	NA	NA	NA
Little Boulder/Deerhorn	1.87	1.77	1.77	1.77	2.68
Tin Cup/Little Butte	3.47	1.54	1.54	1.54	2.10
Butte	1.19	1.15	1.15	1.15	3.20
Granite Boulder	6.74	2.32	2.32	2.32	3.95
Wildlife Emphasis Area LRMP Standard 1.5					
Davis/Placer	0.0	0.0	0.0	0.0	0.0
Vinegar	NA	NA	NA	NA	NA
Vincent	NA	NA	NA	NA	NA
Little Boulder/Deerhorn	0.0	0.0	0.0	0.0	0.0
Tin Cup/Little Butte	0.0	0.0	0.0	0.0	0.0
Butte	0.89	0.70	0.70	0.70	0.81
Granite Boulder	NA	A	NA	NA	NA

Treatment of vegetation, whether through harvest or burning, reduces wildfire risks, and consequently reduces the potential for loss of wildlife habitat to uncharacteristically severe events such as infestations and fire. The table below displays the percent of the forest stands remaining at a high potential for a crown fire after recommended treatments are implemented.

Summary Table 19—Percent Area Remaining at High Crown Fire Hazard

ALTERNATIVE	DRY FOREST	MOIST FOREST
1	66	60
2	44	55
3	50	56
4	61	59
5	40	54

Undesired Condition—Noxious Weed are Present

ALTERNATIVE COMPARISON

Under Alternative 1, current monitoring of new noxious weed sites would continue. Populations included in the Malheur National Forest Noxious Weed Environmental Assessment, June 2000 (Noxious Weed EA) would be treated as analyzed in that document. All new weed infestations would persist, enlarge, and/or spread seed to new locations, displacing an ever-enlarging area of native vegetation. Opportunity of spread would only occur to those soils disturbed from current activities. No additional soil disturbance would occur.

Not eradicating existing new established sites within the analysis area, not identified or addressed in the Noxious Weed Ea, could offset the effects of treatments under the Noxious Weed EA. This could allow

the new untreated populations to re-infest the treated areas. In the long-term, this could offset the effort and expense of eradication efforts within the watershed, and add to the burden of off-forest weed seed that would inevitably initiate new infestations.

In Alternatives 2-5, the major effect to the understory vegetation that creates potential opportunity for noxious weed spread comes from ground disturbance. Total acres to be treated offer a general measure for comparison of relative disturbance for the five alternatives. These soil disturbance activities include upland acres to be treated, road construct and reconstruction; trail and trailhead construction and reconstruction, new dispersed campsites, and aspen release harvests.

Summary Table 20—Acres of Disturbed Soils from Alternative Projects

ACTIVITY	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Upland Treated Acres*	0	31,650	25,880	18,490	32,570
Road Construction & Reconstruction	0	80	80	13	100
Trail/Trailhead Construction & Reconstruction	0	12	12	3	17
New Dispersed Campsites	0	3	3	3	3
Aspen Release Harvest	0	30	30	30	30
TOTAL	0	31,777	26,008	18,543	32,725
NOTES: = ALT. = Alternative * = Upland acres include harvest and prescribed burn					

Alternatives 2 and 5 would implement a combination of manual and chemical methods of treating the noxious weed sites where as Alternatives 3 and 4 would use manual methods only.

Because manual treatment methods are not always as effective as chemical application, some of the newer weed infestations may persist, enlarge, and/or spread seed to new locations. However, spread of known populations would be slowed, and amount of seed dispersed would be reduced, but both may continue if the infestations cannot be eliminated.

The following table displays the amount of manual and chemical methods to be used in combating noxious weed within the analysis area.

Summary Table 21—Recommended Noxious Weed Treatments

METHOD	ALT. 1		ALT. 2 & 5		ALT. 3 & 4	
	Population s	Acres	Population s	Acres	Population s	Acres
Manual	0	0	4	0.4	10	1.9
Chemical	0	0	6	1.5	0	0
TOTAL	0	0	10	1.9	10	1.9

OTHER CONSEQUENCES

Socio/Economic

ALTERNATIVE COMPARISON

The impacts of the Southeast Galena Restoration Project alternatives with incremental effects of past, present, and reasonably foreseeable future actions and all ownerships may have cumulative effects on the human dimension and the biophysical environment.

Information on demographics; economic base; local communities; recreation use; non-forest timber products; special use permits; attitudes, beliefs, and values; health and safety; American Indians;

environmental justice and implementation costs are partly discussed in the document and further details in the analysis file.

DEMOGRAPHICS

The primary effect on demographics would be from potential changes in total population due to changes in employment. There would be no new employment opportunities created from the no action alternative. Alternatives 2, 3, and 5 would contribute employment from timber-harvest related employment for area residents, which would contribute toward maintaining local population levels over the next two to three years. Opportunities for restoration and enhancement work from post-sale timber –harvest restoration would be provided for the next ten years in addition to recommended project under aquatic and infrastructure improvements.

ECONOMIC BASE/LOCAL COMMUNITIES

The primary effects on the economic base would occur from changes in employment and income associated with level of harvest operations. This has a direct influence on jobs in the area for both temporary and permanent opportunities. There are many factors that influence these projections and are further described in the document and the analysis file.

The table below displays the potential and projected volumes with the related potential jobs and projected incomes per alternative. The jobs and incomes are associated with the recommended timber sales with the other restoration work described under “local communities”. There are several way that influence projected jobs and income, which includes *direct* (i.e. harvest, mills, processing), *indirect* (i.e. industry supplies, equipment), and *induced* (i.e. local spending, business spending) influences.

Summary Table 22—Potential/Projected Volumes, Jobs, and Income

ITEM	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Volume	0	44 MMBF	33 MMBF	0	55 MMBF
Direct Jobs	0	251	188	0	317
Total Jobs		402	301	0	507
Direct Income	0	\$7.0 million	\$5.2 million	0	\$8.8 million
Total Income		\$11.2 million	\$8.4 million	0	\$14.1 million
NOTE: ALT. = Alternatives MMBF = Million Board Feet					

Other restorative projects provide a variety of opportunities that require widely varying equipment and skills. Potential benefits to local communities for stewardship employment opportunities are provided by the action alternatives. No new opportunities would be provided under Alternative 1.

For the action alternatives, projects outlined under aquatic, vegetation, and infrastructure would provide opportunity for the next ten years depending on the amount of funding received. These projects include such opportunities as hydrology and fisheries restoration and enhancement projects and dispersed campsites and trail improvements.

RECREATION USE

Demands for recreation on public lands would continue in the future, especially in undeveloped and remote settings. Many of the uses within the Southeast Galena Analysis area include fishing, big game hunting, ATV use, camping, horn hunting, and personal mushroom and firewood collection. All of these uses are impacted by these alternatives and are discussed in more detail in the document and specialist reports in the analysis file. Intrinsic values such as attitude and beliefs are discussed later.

NON-TIMBER FOREST PRODUCTS

Focus for non-timber forest products include changes that occur to the analysis area from timber harvest, burning, and road access.

Alternative 1 would not implement any new projects, therefore, uses for wild food plants (i.e. mushrooms, berries), medicinal plants, and other materials such as firewood, would continue at current levels. What would remain is the high concern toward uncharacteristically severe fire. Depending on the occurrence and the severity of the occurrence, mushrooms, berries, firewood, etc. could be enhanced.

The action alternative projects of timber harvest, pre-commercial thins, and burning would enhance opportunities for a variety of non-timber forest products proportionate to the amount of treatment altering vegetation habitat.

Summary Table 23—Amount of Potential Enhanced Non-Timber Forest Products (Acres)

DISTURBANCE	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Harvest Acres	0	9,760	7,330	0	11,340
Burn Acres▼	0	11,370	10,640	17,230	10,780
NOTES: ALT. = Alternatives ▼ Acres do not include prescribed fire associated with prescriptive fire on harvest acres.					

SPECIAL USES

Many of the special uses located within the analysis area include livestock grazing, power lines, irrigation/mining ditches, and mining claims. One would see no changes if Alternative 1 (no action) was selected. The impacts of action alternatives would affect special use permits, facilities, rights or claims from changes in access, timber harvest, prescribed fire. Improvements or increases in motorized access would provide better access for permittees. Road improvements would benefit power line right-of-ways, but decommissioning would potentially reduce access to some sites. Harvest activities would cause livestock to congregate.

Access plans would affect special use proportionately with the following access plan results.

Summary Table 24—Percent Change in Road Access

	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Total Miles	267	219	218	202	228
Percent Change	NA	-18%	-18%	-24%	-15%

ATTITUDES, BELIEFS AND VALUES

Attitudes reflect people's evaluation of something as either favorable or unfavorable, beliefs reflect what people think is true about something. Beliefs therefore can be a reason for one or more types of attitude. Values reflect what people consider to be precious to them.

Alternative 1 would have no change from current management. Those who believe that passive management is an appropriate response to ecological restoration—would prefer this approach. However, with this approach the seven identified undesired conditions (see 1.2.1 Undesired Conditions, page 8) would continue at present trends. The importance of spiritual renewal, geographic place attachment, and existence values would be retained in the short-term, but would either exist at high risk of dramatic change to an event such as uncharacteristically severe wildfire, in the long-term, or disappear altogether when an event similar to the Summit Fire occurs. In the same manner, a risk exists for those who appreciate these values in the Scenic and Roadless Areas found within the analysis area.

The Action Alternatives would see short-term impacts for those that prefer more primitive uses and non-motorized settings. The apparent naturalness and sense of attachment would be altered by harvest, prescribed burn, and other modifications from the existing condition. People who feel passive management approaches should be allowed to take their natural course would feel the ecological and non-commodity values were diminished as a result of the active management approaches for restoration in the analysis area. The sense of spiritual renewal, and preserving the area for future generations may be reduced by the amount of management recommended in a number of the action alternatives, to a greater or lesser degree by some people. These projects however, would reduce the risk of an uncharacteristically severe wildfire event from occurring; thereby improvements would begin to move resources in the analysis area into a more resilient, vigorous state which are identified by the desired conditions which were arrived at from goals, objectives, and standards in the *Land and Resource Management Plan* as amended.

HEALTH AND SAFETY

The primary issues raised in regard to health and safety focused on potential smoke from wildfires in the high fire hazard areas and concerns with air quality to people residing in Bates, Austin, Austin Junction,

and Greenhorn. Other issues raised were health effects from chemical treatments, safety concerns to workers and the public about hazard trees and the potential of uncharacteristically severe wildfire as a dangerous event to firefighters and the public alike.

In Alternative 1, high fire hazard would not be addressed and would have the least impact on air quality in the near future. In the long-term (50+ years), the potential for large amounts of smoke from daily inversions would increase due to increases in biomass and fire risk. In the near future, the above populated areas would not be affected, however, in the long-term, air quality, the risk to firefighters during suppression efforts, would grow, depending on the extent, severity, and duration of a wildfire. An increase in traffic and equipment to suppress fire would be a safety concern as well during an uncharacteristically severe wildfire.

Access would continue to deteriorate, resulting in declines in user safety.

No risk to chemical use would occur in this alternative.

In the action alternatives, mechanical and prescribed burning treatments would decrease potential for adverse air quality to occur. Biomass would be reduced and treated during periods of the year when inversion is less likely to occur. These treatments reduce the potential for uncharacteristically severe wildfire, thereby reducing the hazard to the local populated areas and to fire suppression personnel.

Alternative 5 would treat the most biomass, followed by Alternative 2, 3, and 4.

In Alternatives 2 and 5, the blow down area in the headwaters of Vinegar Creek would have reductions in fallen material reducing potential for a severe wildfire to the town of Greenhorn. Alternatives 3 would not remove blow down material in the RHCAs of Vinegar Creek but would salvage the uplands, whereas Alternative 4 would not salvage either the RHCAs or uplands. The hazard of a severe fire would remain for Alternative 4 and to a lesser degree it would remain in Alternative 3.

In all action alternatives there would be fewer roads left open than current conditions. Safety for recreation users of roads would improve due to improved conditions of roads left open.

Prescribed burning could produce some smoke hazards across public highways, but signs, local announcements, and pilot cars, if needed, would help reduce risk of an accident.

Potential effects from herbicides would be mitigated by using trained and licensed applicators and following application standards. Chemicals recommended for treatment have low to moderate potential toxic effects but anticipated exposure in Alternatives 2 and 5 is far below the toxic level. No herbicides are recommended in Alternative 3 or 4.

AMERICAN INDIANS

The potential effects to tribal treaty rights and interests were focused to motorized access, fish, wildlife, and plants.

Alternative 1 would have no effect on access to traditional sites for hunting and gathering but for those traditional areas that are currently not accessible due to road conditions, they would remain inaccessible. Recommended aquatic projects to improve habitats would not be implemented continuing the undesirable conditions such as high water temperatures due to lack of shade, sediment delivery due to road locations, low stream meander due to entrenchment from past mining, and lack of woody debris forming needed pools. These conditions would continue the trend of these undesired conditions adversely affecting fish that once were more abundant. This results in reduced catch rates to American Indians as well as recreation fisherman.

Upland vegetation would remain in a conditions in many areas of the analysis area that are out of proportion with historic conditions in structure, composition, and density. Native grasses, forbs, and shrubs would continue to decline due to competition with other vegetation for sunlight, water, and nutrients. Noxious weed would also continue to displace native plants, reducing vegetative diversity, reducing preferred native browse.

In Alternatives 2, 3, and 5, improvements to the transportation system would occur, providing more opportunities for motorized access in areas that are currently difficult to reach. However, many roads would be closed and decommissioned (removed from the transportation system) reducing access to some areas, however, improving resources such fish habitat by the improvement and removal of many of these roads. Other aquatic projects such as construction of in stream structures and improved stream meander would improve habitat, in turn increasing fish numbers. Vegetation projects would reduce tree number to more historic levels which create more resilient forest stands enabling areas to withstand lower levels of insects infestations of lower intense wildfire. The more open stands also improve enhance browse for ungulates and open up the forest floor for growth of more berry crops. Recommended periodic fire would stimulate some cultural plants that tribes and others collect for consumption, and religious uses.

Alternative 4 would benefit from the same improvements to the transportation system but would not see the same stimulating effects from recommended harvest as described above. However, some prescribed fire would occur helping to reduce forest litter.

ENVIRONMENTAL JUSTICE

This section evaluates how the recommended alternatives may affect subsets of people in consideration of equity and fairness in resource decision-making. This analysis focuses on potential effects to minority populations, disabled persons, and low-income groups.

In Alternative 1 all current uses of the National Forest System lands would continue. Effects to minority populations, disabled persons, and low-income groups would not be disproportionate with other current users of these same lands.

Proportionately, the action alternatives provide a variety of opportunities for potential project contracts. Nor would alternatives have impact on the contraction process or the USDA Small Business Administration program for reserving contracts for minority groups.

Changes in access due to increased improvements to road conditions and decreases in open road miles would occur over the long-term. Varying impacts would occur to disabled people, low-income groups that require motorized access to participate in recreational activities such as hunting, dispersed camping, firewood gathering, or collection of non-timber forest products. Impacts include easier access for areas currently inaccessible and improved campsites currently displaying difficult access. There would be less but improved access for areas of forest treatments that result in improve diversity in vegetation such as mushrooms and berries. This is primarily due to reduced forest densities and periodic fire that open up the forest floor stimulating growth of berries and mushrooms. This creates opportunity for disabled and others that currently are restricted due to current conditions of the transportation system and dense forest stands.

ECONOMIC VIABILITY OF TIMBER SALES

The tentative advertised bid rates estimated reflect the volumes, price, and costs estimated for the analysis. Each action alternative that proposes harvesting would produce positive tentative advertised bid rates indicating that recommended timber sales would receive bids. The following table displays what would be anticipated from each alternative.

Summary Table 25—Tentative Advertised Bid Rates and Volumes

ITEM	ALT. 1	ALT. 2	ALT. 3	ALT. 4	ALT. 5
Bid Rate	0	\$52.5/CCF	\$59.0/CCF	0	\$57.6/CCF
Revenue	0	\$4.7 million	\$3.9 million	0	\$6.4 million
Cubic Ft. Volume	0	85,460 CCF	63,940 CCF	0	107, 920 CCF
Board Ft. Volume	0	45 MMBF	34 MMBF	0	56 MMBF
NOTES: ALT. = Alternative CCF = hundred cubic feet MMBF = million board feet					

These estimates are subject to change due to differing market conditions.

Map A—Vicinity Map Southeast Galena Restoration Project

